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EXAMINER	
WANG, EUGENIA	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/761,217	ARAKAWA, HIROSHI	
	Examiner	Art Unit	
	EUGENIA WANG	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3 6, 7, and 9-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 January 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the amendment received on July 29, 2008:

   a. Claims 1, 3, 6, 7, and 9-12 are pending.

   b. The previous 112 rejections have been withdrawn in light of the amendment.

   c. The core of the previous rejection is maintained with slight changes made, as necessitated by the amendment.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 29, 2008 has been entered.

Drawings

3. Figures 9-10 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the

applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 recites the limitations "the pressure" and "the preset pressure" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. (Note: The only "pressure" previously mentioned is an opening pressure. Therefore the claim language of claim 9 reciting the pressure in the battery and the preset pressure is confusing as neither pressure specifically refers to the previous opening pressure and neither is defined prior to that.)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1, 3, and 6 rejected under 35 U.S.C. 103(a) as being unpatentable over over US 2002/016554 (Nemoto et al.) in view of US 4482616 (Connolly et al.) as evidenced by US 2002/0102458 (Maleki et al.).

As to claims 1, 3, and 6, Nemoto et al. teach a lithium secondary battery (with electrodes [2 and 3] and electrolytic solution entered through nozzle [12] (fig. 1)) that has a pressure release valve at the end portion of the battery as a safety mechanism for preventing accidents caused from the rise of a battery's internal pressure due to evaporation of electrolyte solution in the case where the battery temperature rises by over-charging or over-discharging (as applied to claims 1 and 3) (para 0141). Figure 14(a) and 14(b) show the ends of the battery. Groove [85] in figure 14(a) acts as a pressure release valve, since it is torn due to mechanical weakening caused by the rising internal pressure, thus releasing the internal pressure (para 142, lines 6-16). In figure 14(b), metal foil [83], which covers hole [86] bursts to release internal pressure making it a pressure release valve as well (para 0143). It is inherent that these pressure release valves would only open when internal pressure of the battery reached a certain pressure that can be preset (as applied to claims 1 and 3). This pressure check system that starts when battery over-charging commences inherently would release the internal pressure (in the form of evaporated electrolyte solution) before an internal short-circuit occurs (as applied to claim 1).

Although Nemoto et al. does not specifically internal pressure, over-charging/discharging, and a temperature rise to an internal short circuit (as claimed by claim 1 of the instant application), a relationship between the aforementioned conditions inherently exists, as evidenced by Maleki et al. Maleki et al. talks about Li-ion batteries under abusive conditions, with the abusive conditions being short circuit (thus encompassing internal and external), over-charging, over-discharging, and operation at high temperatures (para 0005). These abusive conditions release combustive gases (note gas release is synonymous with rising internal pressure within a given system) (para 0005). Thus, over-charging/discharging as well as short circuit both result in an increase of internal pressure within a battery system. Therefore, the battery of Nemoto et al. activates the safety mechanism 10 seconds before an inside short-circuit occurs, as the purpose of the safety valve is to prevent such abusive condition, and thus cases where Nemoto et al.'s battery vents without short-circuiting would inherently exist.

Furthermore, the battery of Nemoto et al. would at least be capable of activated ten seconds or more before an inside short-circuit occurs, as the pressure at which venting occurs is controllable (and thus is therefore configured in such a manner). Thus, by venting at a pressure lower than that indicative of a short circuit would prevent short circuiting, and thus have the safety mechanism activate before the internal short-circuit occurs.

It has been held that the recitation of an element is "capable" of performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchinson,* 69 USPQ 138.

While intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Furthermore, it is noted that this characteristic would still inherently occur at the specified charging current of approximately 50 amps and an opening pressure lower than 1.5 MPa.

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but

the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

In the case of the instant application the basis for expectation of inherency is that the battery of Nemoto et al. is structurally the same as the claimed battery and therefore behaves or at the very least is capable of behaving in the same manner (see above for Office's position on "capable of" with respect to apparatus claims). Furthermore, the instant application links current, pressure, and time difference (see para 0028), which supports the fact that they are operational conditions, and that under the condition of a charging current of 50 amps and an opening pressure of 1.5 MPa, the resultant of a time difference of activation to short-circuit of ten seconds or more, and vice versa. Therefore, the position is taken that since the apparatus of Nemoto et al. and the claimed invention of instant application are the same, both will behave in the same manner under the same operational conditions (i.e. at a charging current of approximately 50 amps and an opening pressure of the safety mechanism lower than

1.5 MPa that the safety mechanism is activated ten or more seconds before the inside short-circuit occurs.).

The Examiner requires applicant to provide that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product.

Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

There is no requirement that a person of ordinary skill in the art would have recognized the inherent disclosure at the time of invention, but only that the subject matter is in fact inherent in the prior art reference. Schering Corp. v. Geneva Pharm. Inc., 339 F.3d 1373, 1377, 67.

Additionally, the battery structure in Nemoto et al.'s invention can be applied to batteries used as a motor driving power source, such as an electric vehicle or a hybrid electric vehicle (para 0053, lines 15-19) (as applied to claim 6).

The difference between the teachings of Nemoto et al. and claim 1 is that Nemoto et al. do not teach (a) that the amount of electrolytic solution provided to a lithium ion secondary battery is equal to or larger than the amount shown by the inflection point and (b) that the amount of electrolytic solution provided into the lithium ion secondary battery is regulated to prevent precipitation of lithium on the electrode.

With respect to both (a) and (b), the optimum amount electrolytic solution to be used is a result effective variable based on the rate of gas decomposition, the internal space of the battery, and battery function (as ions are transported through the electrolyte). Discovery of optimum of result effective variable in known process is ordinarily within the skill of art. (In re Boesch, 205 USPQ 215 (CCPA 1980).) Selection of optimum ranges within the prior art's general condition is obvious. (In re Aller, 105 USPQ 233(CCPA 1955))

Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to alter the result effective variable of the amount of electrolytic solution provided in order to optimize the amount provided with respect to the space available inside the battery, the decomposition rate of the electrolytic solution, and function of battery with respect to the electrolytic solution (as it is what provides ion transport).

Additionally, with respect to (b), it is noted that Connolly et al. is relied upon. Specifically, Connolly et al. teach about lithium secondary batteries (some of which involve liquid solutions) (col. 2, lines 11-42). Specifically, Connolly et al. teach that the active material must be completely soluble in the electrolyte during discharging in order to facilitate their transfer through the electrolyte (col. 1, lines 60-68; col. 2, lines 1-10). Furthermore, during charge and discharge, the active material must be transported through the electrolyte, wherein it is imperative that the material is completely dissolved (i.e. no precipitation on the electrode), wherein the electrolyte provides such a capability. If the electrolyte does not have the convention to do so, current distribution

is uneven resulting in dendrites, asymmetrical deposition of active materials, and irreversible behavior (col. 2, lines 43-68; col. 3, lines 1-12). Therefore the motivation for having enough electrolyte solution in order to prevent precipitation of lithium on an electrode is to prevent dendrite growth and irreversible behavior of the cell. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to provide the battery of Nemoto et al. with adequate electrolyte (wherein Nemoto et al. teach that the electrolyte is evaporated, which would result in a decrease in electrolytic solution), as Connolly et al. teach that a sufficient electrolyte (and thus the amount of electrolyte present) is needed prevent dendrite growth and irreversible behavior of the cell.

6. Claims 7 and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nemoto et al. in view of Connolly et al. and US6696197 (Inagaki et al.), as evidenced by Maleki et al. and US 6437542 (Liaw et al.),

As to claims 7 and 9 Nemoto et al. teach a lithium secondary battery that has a pressure release valve at the end portion of the battery as a safety mechanism for preventing accidents caused from the rise of a battery's internal pressure due to evaporation of electrolyte solution in the case where the battery temperature rises by over-charging or over-discharging (as applied to claims 7 and 9) (para 0141). Figure 14(a) and 14(b) show the ends of the battery. Groove [85] in figure 14(a) acts as a pressure release valve, since it is torn due to mechanical weakening caused by the rising internal pressure, thus releasing the internal pressure (para 142, lines 6-16). In figure 14(b), metal foil [83], which covers hole [86] bursts to release internal pressure

making it a pressure release valve as well (para 0143). It is inherent that these pressure release valves would only open when internal pressure of the battery reached a certain pressure that can be preset (as applied to claims 7 and 9). This pressure check system that starts when battery over-charging commences inherently would release the internal pressure (in the form of evaporated electrolyte solution) before an internal short-circuit occurs (as applied to claim 7).

Although Nemoto et al. does not specifically internal pressure, over-charging/discharging, and a temperature rise to an internal short circuit (as claimed by claim 7 of the instant application), a relationship between the aforementioned conditions inherently exists, as evidenced by Maleki et al. Maleki et al. talks about Li-ion batteries under abusive conditions, with the abusive conditions being short circuit (thus encompassing internal and external), over-charging, over-discharging, and operation at high temperatures (para 0005). These abusive conditions release combustive gases (note gas release is synonymous with rising internal pressure within a given system) (para 0005). Thus, over-charging/discharging (corresponding to a first time) as well as short circuit (corresponding to a second time) both result in an increase of internal pressure within a battery system.

Additionally Nemoto et al. does not specifically link internal pressure to charge current. However, Liaw et al. teach that internal pressure can have multiple dependencies including time, operating temperature, ambient pressure, voltage range, current level, charge inputs (charging current) (col 2, lines 19-26).

For simplicity's sake, it is summarized that Maleki et al. and Liaw et al. are evidentiary pieces that show that short-circuiting is related to internal pressure, which is also related to time and charge inputs (charging current).

The differences between the teachings of Nemoto et al. and claim 7 is that Nemoto et al. do not teach that (a) the amount of electrolytic solution provided to a lithium ion secondary battery is equal to or larger than the amount shown by the inflection point, (b) the amount of electrolytic solution provided intot he lithium ion secondary battery is regulated to prevent precipitation of lithium on the electrode, and (c) at a charging current of approximately 50 amps and an opening pressure safety mechanism lower than approximately 1.5 MPa that the safety mechanism used to discharge the decomposition gas has an underlying basis of two times the first time is from overcharging to discharging and the second time is from overcharging to inside short-circuiting with the difference between the two times being ten seconds or more.

With respect to both (a) and (b), the optimum amount electrolytic solution to be used is a result effective variable based on the rate of gas decomposition, the internal space of the battery, and battery function (as ions are transported through the electrolyte). Discovery of optimum of result effective variable in known process is ordinarily within the skill of art. (In re Boesch, 205 USPQ 215 (CCPA 1980).) Selection of optimum ranges within the prior art's general condition is obvious. (In re Aller, 105 USPQ 233(CCPA 1955))

Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to alter the result effective variable of the amount

of electrolytic solution provided in order to optimize the amount provided with respect to the space available inside the battery, the decomposition rate of the electrolytic solution, and function of battery with respect to the electrolytic solution (as it is what provides ion transport).

Additionally, with respect to (b), it is noted that Connolly et al. is relied upon. Specifically, Connolly et al. teach about lithium secondary batteries (some of which involve liquid solutions) (col. 2, lines 11-42). Specifically, Connolly teach that the active material must be completely soluble in the electrolyte during discharging in order to facilitate their transfer through the electrolyte (col. 1, lines 60-68; col. 2, lines 1-10). Furthermore, during charge and discharge, the active material must be transported through the electrolyte, wherein it is imperative that the material is completely dissolved (i.e. no precipitation on the electrode), wherein the electrolyte provides such a capability. If the electrolyte does not have the convention to do so, current distribution is uneven resulting in dendrites, asymmetrical deposition of active materials, and irreversible behavior (col. 2, lines 43-68; col. 3, lines 1-12). Therefore the motivation for having enough electrolyte solution in order to prevent precipitation of lithium on an electrode is to prevent dendrite growth and irreversible behavior of the cell. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to provide the battery of Nemoto et al. with adequate electrolyte (wherein Nemoto et al. teach that the electrolyte is evaporated, which would result in a decrease in electrolytic solution), as Connolly et al. teach that a sufficient electrolyte

(and thus the amount of electrolyte present) is needed prevent dendrite growth and irreversible behavior of the cell.

As to (c), Inagaki et al. teaches the fact that the electrolyte (electrolytic solution) can be ignited by an internal short-circuit (col. 13, lines 15-23). Therefore the gas decomposed from the electrolytic solution is flammable as well.

The motivation for venting the decomposed gas prior to short-circuiting, as taught by Nemoto et al., is to prevent this situation. In order to do this, the two aforementioned times must be found, and the difference between the two times provide the amount of time between the two provide the time that is available for venting, which can be used to ensure the completion of venting before short-circuiting (i.e. 10 seconds or more, as claimed by the instant application). Ignition is thus a result effective variable based on the two previously mentioned times.

The applicant shows that the longer the time period between the difference of the two aforementioned times, the less likely ignition will occur. This relationship is what would be expected, as Ingaki et al. mentions the flammability of the electrolytic solution. Discovery of an optimum of result effective variable in known process is ordinarily within the skill of art. (In re Boesch, 205 USPQ 215 (CCPA 1980).) Selection of optimum ranges within the prior art's general condition is obvious. (In re Aller, 105 USPQ 233(CCPA 1955)) It is also important to reiterate that internal pressure is directly affected by over-charging and increases due to the evaporation of the electrolytic solution (as applied to claim 9) (Nemoto et al., para 0141). Therefore the pressure at

which the safety valve is preset to open can be calculated with respect to the difference between the two aforementioned times.

Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to base the activation of the battery's safety mechanism on the two aforementioned times (including their application to internal pressure) in order to prevent ignition of the decomposition gas.

Recall that Maleki et al. and Liaw et al. are evidentiary pieces that show that short-circuiting is related to internal pressure, which is also related to time and charge inputs (charging current). Therefore optimizing the time period between venting and short-circuiting (as obviated above) would consequently lead to optimizing the safety mechanism activation pressure with respect to the charging current, as they are all interconnected. Since none of the aforementioned variables are asserted to be more critical than another, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to provide a preset opening pressure at a charging current acceptable to the battery (i.e. 1.5 MPa corresponding to 50 amps) in order produce the predictable result of a battery that opens the safely vent before short circuiting to prevent ignition.

As to claims 9 and 10, none of Nemoto et al., Connolly et al., and Inagaki et al. specifically notes that the preset pressure is lower than 1.5 MPa (thus opening at such a pressure to discharge internal pressure from decomposed gas), wherein the preset pressure is based on (a) a relationship between the pressure at which the safety valve

opens and the difference between the second time and the first time (as required by claim 9) or (b) the charging current (50 amps) of the battery.

It is first noted that within the rejection to claim 7, Nemoto et al. teaches opening a safety valve to release internal pressure (from the decomposed gas), Liaw et al. and Maleki et al. show that short-circuiting is related to internal pressure, which is also related to time and charge inputs (charging current). Additionally, Inagaki et al. teaches the fact that the electrolyte (electrolytic solution) can be ignited by an internal short-circuit (col. 13, lines 15-23). Therefore the gas decomposed from the electrolytic solution is flammable as well, thus giving motivation for venting the decomposed gas ten seconds prior to short-circuiting to prevent this situation (refer back to rejection to claim 7).

Therefore optimizing the time period between venting and short-circuiting (as obviated in the rejection to claim 7) would consequently lead to optimizing the safety mechanism activation pressure with respect to the charging current, as they are all interconnected. Therefore, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to provide a preset opening pressure at a charging current acceptable to the battery (i.e. 1.5 MPa corresponding to 50 amps) in order produce a battery with the predictable result of opening the safely vent before short circuiting to prevent ignition (barring a proof of unexpected results or criticality).

As to claim 11, the difference between the teachings Nemoto et al., Connolly et al., and Inagaki et al. is that they do not explicitly teach that the amount of electrolytic solution provided to a lithium ion secondary battery based on the difference between the

first and second time. However, the amount of electrolytic solution that can be provided to the battery is inherently dependent on the amount of internal space of the battery, the rate of gas decomposition, and the opening of the safety valve. The safety valve (as taught by Nemoto et al.) is pressure dependent, which not only indicates the amount of gas decomposition but also relates to the difference between the first and second time (see rejection for claims 7 and 9). Since the discharge of decomposition gas can be linked to the amount of space in the battery and the pressure inside the battery, a relationship can be drawn between the difference between the first and second time and the amount of electrolytic solution that can be supplied to it.

As to claim 12, neither nor Nemoto et al. and Inagaki et al. specifically mention that charging current is a basis for the amount of electrolytic solution provided to the lithium ion secondary battery.

However, as noted before, Liaw is used to show that internal pressure, time, operating temperature, ambient pressure, voltage range, current level, and charge inputs are connected (col 2, lines 19-26). Additionally, time has already been established as a variable that affects the electrolytic solution amount (see rejections for claim 11). Since none of the aforementioned variables are asserted to be more critical than another, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to provide a certain amount of electrolytic solution using any of the aforementioned variables (in this case charge input/current level) in order to provide the necessary amount of electrolytic solution needed by the battery.

Response to Arguments

7. Applicant's arguments filed July 29, 2008 have been fully considered but they are not persuasive.

Applicant argues that it is not disclosed or suggested within the prior art that a safety mechanism configured to be a activated before an inside short-circuit occurs and to discharge decomposition gas of the electrolytic solution that is generated inside the lithium ion secondary battery to an outside of a battery when the battery is overcharged, wherein the safety mechanism is configured so that at a charging current of 50 amps and an opening pressure lower than 1.5 MPa, the safety mechanism is activated 10 seconds or more before the inside short circuit occurs.

Examiner respectfully disagrees. With respect to the apparatus claim (claim 1), this is merely an operational condition. Applicant has failed to show that the apparatus of Nemoto et al. is different than that of the instant application. Therefore, the apparatus of Nemoto et al. at the very least capable of operating in the same manner under the same conditions. With respect to the method claim (claim 7), Examiner has set forth the fact that charging current, internal pressure, and time to short circuiting are interrelated (see the rejection for details), which would all be of knowledge to one of ordinary skill in the art. Therefore, ensuring safety of the battery (venting a certain amount of time prior to short-circuiting), consequently relates to charging current (any set amount appropriate for the battery) and thus the set pressure for safety mechanism activation (set at a pressure in order to allow the appropriate amount of time for venting to occur). Thus manipulating the variables with respect to one another in order to obtain

the predictable result of having a safe, operational battery would have been within the skill of the ordinary artisan (barring a showing of any unexpected results).

Applicant argues that the newly recited feature (of regulating the amount of electrolytic solution provided into the lithium ion battery to prevent precipitation of lithium on the electrode) is not taught.

Examiner respectfully disagrees. As set forth, in the rejection. The amount of electrolyte within a system is a result effective variable (between internal space of the battery, decomposition rate, and needed ion transport for the electrolyte). Applicant has not provided any proof or reasoning as to how one of ordinary skill in the around would not have found optimization of the electrolyte within a system obvious. Accordingly, Examiner maintains the rejection as above. Additionally, Connolly et al. is relied upon to show that the electrolyte is in charge of transporting ions for battery function and is linked to keeping active material (lithium) from being precipitated, wherein precipitation leads to dendrite growth and irreversible behavior. Accordingly, such a teaching combined with Nemoto et al. as evidenced by Maleki et al. would obviate such regulation of electrolyte. (See also the rejections to claims 1 and 7 for the full position set forth.)

Applicant argues (with respect to claim 1), that using the term "configured" recites a structural feature.

Examiner respectfully disagrees. As set forth within the rejection, Nemoto et al. has all of the structural elements of the claimed invention. Accordingly, it is “configured”

to act in such a manner, as it is capable of doing so. Therefore, the argument is not found persuasive and the rejection of record is upheld.

Applicant argues that the use of inherency is a mischaracterization of Applicant's arguments, since the cited references do not disclose the same structure as recited in the claims (a safety mechanism configured to activate ten seconds before an internal short circuit occurs, at a charging current of 50 amps and a pressure lower than 1.5 MPa) and thus does not sufficiently establish inherency.

Examiner respectfully disagrees. First, Examiner would like to note that such an argument only applies to the apparatus claim (claim 1), which the response will deal with. Examiner respectfully disagrees. As set forth within the rejection and within the response to the previous argument, the term "configured" to does not further structurally define the apparatus. As set forth in the rejection, the structure of Nemoto et al.'s battery is the same as that of the structure of the claimed invention. Applicant has not provided any proof or showing as to how the structure of their claimed invention differs from that of Nemoto et al. or how Nemoto et al. would not be capable of operating in the same manner (with the same preset conditions, charging current, etc.). Therefore, as set forth within the rejection, under the same conditions (a charging current of 50 amps and an opening pressure lower than 1.5 MPa), it would inherently operate in the same manner (activating 10 seconds before an internal short circuit occurs). Applicant has not clearly set forth how the structure of their claimed invention and that Nemoto et al. are different. Accordingly, they are seen to be the same, wherein the same structure put under the same conditions would most definitely act in the same manner.

Therefore, Examiner submits that inherency has been properly and sufficiently established.

Applicant argues that none of the references disclose regulation of the electrolytic solution such that lithium is not precipitated on the electrode.

Examiner respectfully disagrees. As set forth, in the rejection. The amount of electrolyte within a system is a result effective variable (between internal space of the battery, decomposition rate, and needed ion transport for the electrolyte). Applicant has not provided any proof or reasoning as to how one of ordinary skill in the around would not have found optimization of the electrolyte within a system obvious. Accordingly, Examiner maintains the rejection as above. Additionally, Connolly et al. is relied upon to show that the electrolyte is in charge of transporting ions for battery function and is linked to keeping active material (lithium) from being precipitated, wherein precipitation leads to dendrite growth and irreversible behavior. Accordingly, such a teaching combined with Nemoto et al. as evidenced by Maleki et al. would obviate such regulation of electrolyte. (See also the rejections to claims 1 and 7 for the full position set forth.)

Applicant argues that the amount of electrolytic solution provided to a battery (as a result of activating the safety mechanism [i.e. releasing built up pressure]) is not a result-effective variable and is non-obvious.

Examiner respectfully disagrees. As set forth within the rejection, the amount of electrolyte within a system is a result effective variable (between internal space of the battery, decomposition rate, and needed ion transport for the electrolyte). Applicant has

not provided any proof or reasoning as to how one of ordinary skill in the around would not have found optimization of the electrolyte within a system obvious. Accordingly, such an argument is not persuasive, and the rejection is maintained.

Applicant argues that one of ordinary skill in the art following Nemoto or Maleki would first select an amount of electrolytic solution, wherein the claim application regulates the electrolytic solution based on the safety mechanism pressure to avoid lithium precipitation on the electrode.

Examiner respectfully disagrees. Nemoto et al., as set froth in the rejection, teach that the electrolyte is evaporated (para 0141). This would result in a decrease in electrolytic solution. It is unsure one of ordinary skill in the art would find it unobvious to replace lost electrolytic solution in such a manner, as the amount of electrolyte provided would be a result effective variable on dependent on the decomposition and evolution of electrolytic solution, the amount of space in the battery, and the function of the ion transport in the battery (which depends on the electrolyte and thus the amount of electrolyte). Applicant has not provided any reasoning or proof to show why one of ordinary skill would not find it obvious to optimize the amount of electrolytic solution, and thus such an argument is not seen as persuasive. Additionally, an alternate rejection to this newly added limitation has been added, wherein Connolly et al. is relied upon to teach that a sufficient electrolyte (and thus the amount of electrolyte present) is needed prevent dendrite growth and irreversible behavior of the cell. Accordingly, Examiner is unsure such a claim limitation would not be obvious to one of ordinary skill in the art

Applicant argues that Examiner's arguments related to burned of proof is immaterial, since the claimed structure is not disclosed or suggested.

Examiner respectfully disagrees. Examiner would like to note that such an argument is drawn to the apparatus claim (as the structure is being cited), and thus such a claim (and not the method claim) will be addressed. As set forth within the rejection the battery of Nemoto et al. has all of the same structural features (electrode, electrolytic solution, safety mechanism, etc.) as that of the instant application. Within the response to arguments, it has been set forth that "configured" to language does not further differentiate such structure, as since the structural features are the same, it is capable of acting in the same manner and thus configured to act in that manner. Therefore, the argument is not found persuasive and the rejection of record is upheld.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EUGENIA WANG whose telephone number is (571)272-4942. The examiner can normally be reached on 7 - 4:30 Mon. - Thurs., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/E. W./
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795